

Before the  
FEDERAL COMMUNICATIONS COMMISSION  
WASHINGTON, D.C. 20554

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In the Matter of )  
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Amendment of the Commission's Rules to )  
Permit Flexible Service Offerings in )  
the Commercial Mobile Radio Services )

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF SECRETARY  
WT Docket No. 96-6

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**COMMENTS OF DSC COMMUNICATIONS CORPORATION**

DSC Communications Corporation ("DSC"), by its attorneys, hereby comments on the FCC's Notice of Proposed Rulemaking in the above-captioned matter ("Notice").<sup>1</sup> As a general matter, DSC believes that the public interest would benefit if commercial mobile radio service ("CMRS") licensees were given the flexibility to provide wireless local loop and other fixed services within their licensed frequencies. DSC supports the Commission's proposal to give CMRS licensees such flexibility. The Commission's proposal would represent a good first step in bringing the benefits of wireless local loop ("WLL") technology to the public. However, in order for users to enjoy the full promise of WLL systems, the Commission should move forward with the necessary steps to make available spectrum in the 1.3-2.7 GHz band for fixed WLL.

**I. STATEMENT OF INTEREST**

DSC is a telecommunications equipment manufacturer headquartered in Plano, Texas. Founded in 1976, DSC is now a global leader in switching technology with tandem switches and intelligent network products deployed throughout the United States and across the globe. In the past few years, DSC has expanded its product offerings to include a growing line of

<sup>1</sup> FCC 96-17.

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access products. Litespan®-2000 and Starspan® combine to form the world's first integrated platform for fiber-to-the-curb service, and are designed to operate in the 28 GHz band.

Airspan® supports wireless fixed access services to the local exchange network using digital radio technology, including wireless local loop. The product and its uses and operation are explained more fully in the attached materials. DSC Airspan® products can be deployed within the 1.3 to 2.7 MHz band, a range that includes the broadband PCS frequencies in the United States. Because DSC's wireless services supported by Airspan®'s wireless fixed access system (and future DSC equipment) can complement broadband PCS services in the United States, DSC has a vital interest in this proceeding.

## **II. THE BENEFITS OF DSC'S WIRELESS LOCAL LOOP TECHNOLOGY**

DSC Airspan® was developed and designed specifically for WLL applications. There are significant benefits to DSC's approach,<sup>2</sup> rather than merely employing a mobile radio technology for fixed use. These benefits, from the standpoint of service, allow Airspan® simultaneously to provide wide area coverage, wireline network speech quality, voice band data and facsimile transparency, 64 kbps data channels, and ISDN. No converted mobile technology can currently provide all these benefits.

By lowering the key barriers to entry — time and money — Airspan® is an ideal product for accelerating the emergence of local competition. By facilitating entry into the local exchange marketplace, WLL technology promotes one of the central objectives of the recently enacted Telecommunications Act of 1996: the encouragement of facilities-based local

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<sup>2</sup> Airspan® utilizes code division multiple access ("CDMA") technology, allowing for efficient frequency reuse and enabling wider band premium services.

competition.<sup>3</sup> With increased facilities-based competition, subscribers will benefit from downward pressure on prices and a larger selection of providers and services.

Airspan® WLL lowers the cost barrier because deployment of Airspan® is far less capital intensive than copper or fiber local loop. As the length of the loop increases, *i.e.*, the distance traversed between the local exchange carrier's switch and the end users, the cost advantages tip even more heavily in the favor of WLL. Just as importantly, breaking down the time barrier, wireless local loop technology can be deployed to serve an area much more quickly than wireline technologies. What might take several years if done on a copper or fiber basis might take only a matter of months using WLL technology. This is for several reasons. For example, the deployment of a wireless local loop network, even over a wide-area, avoids the need to negotiate rights-of-way, and the local governmental civil works-related authority is limited principally to base station preparation. Stations completing a loop can usually be installed in considerably less time than it takes to run the wire.

By installing networks utilizing fixed WLL facilities in combination with copper or fiber loops, a local carrier could optimize the economics to minimize costs. While the initial phase of implementation might involve the rapid deployment of wireless loop facilities throughout the network, later phases might see the "back-filling" of urban and some suburban areas with copper and fiber plant.

In addition, a local operator can adjust WLL cell size, depending upon terrain and subscriber density. In rural areas, the wireless link could be extended up to about 15 km

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<sup>3</sup> See 47 U.S.C. §§ 251(c)(1)-(6) (obligations of incumbent LECs to accommodate facilities-based competition), 252 (negotiation and arbitration of interconnection agreements), and 272 (facilities-based competition as a pre-condition to RBOC entry into in-region long distance markets).

using DSC's Airspan® products. In contrast, the cell size, in urban areas, can be reduced to approximately 500 meters. Accordingly, the flexibility of the Airspan® products accommodates frequency re-use in any geographic area appropriate to the population density, maximizing the WLL technology's potential usefulness.

Wireless local loop technology also supports another important goal of the Telecommunications Act of 1996, namely universal service to rural and high-cost areas. As indicated above, the deployment of wireless local loop technology to a more widely scattered population is much more cost-effective than wireline solutions. Therefore, it will be much more economical to install and maintain service to rural and high cost areas using wireless local loop rather than copper and fiber technologies. Even where rural and high cost areas are already served by wireline loop technologies, the availability of wireless local loop will encourage facilities-based competition that very well might not otherwise emerge.

Furthermore, wireless local loop technology offers efficient solutions to restoring service quality following natural disasters that cause major disruptions to local telephone service. Indeed, coastal areas and other locations prone to such disasters, (for example, hurricanes,) may be better served by the installation of wireless local loops.<sup>4</sup> WLL is also appropriate for deploying a local "network" on a temporary basis, such as a special large-scale event like the Olympic games.

The benefits of the Airspan® WLL products have already been proven in international markets. Although designed and manufactured entirely in the United States, the system has

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<sup>4</sup> In addition to plain old telephone service, *i.e.*, POTS, Airspan® technology can be used to provide high-density graded service for subscribers in office blocks or high-rise apartment buildings, for data links to remote locations, ISDN in private and public networks, and microcellular trunking for PCS, GSM, or DECT microcells.

been designed flexibly to meet various international standards and to operate over a wide frequency range to conform to the table of spectrum allocations adopted in many different countries in Europe, Asia, and elsewhere. Airspan® is suitable for emerging competition in many developed and developing countries as they continue to liberalize their former government-monopoly telecommunications systems. Airspan® is also a particularly attractive low-cost and rapid solution for deploying local networks in developing countries, where line penetration is low and waiting lists for telephone service are long.

Today, Airspan® has been deployed in the 2 GHz band and is under evaluation in 15 countries around the globe, promising efficient, high quality wireless services to many thousands of users. Such fixed services are not available to U.S. consumers, however, because the Commission's CMRS rules restrict use of this spectrum for such applications, and there is not spectrum otherwise established for its use. By removing these artificial market restraints, the Commission will enable U.S. consumers to purchase fixed wireless services on the same footing as the rest of the world.

### **III. AS A FIRST STEP TO BRINGING THE BENEFITS OF WIRELESS LOCAL LOOP TO THE AMERICAN PUBLIC, CMRS LICENSEES SHOULD BE PERMITTED THE FLEXIBILITY TO DEPLOY WIRELESS LOCAL LOOP IN THEIR ASSIGNED FREQUENCIES**

The Commission's *Notice* pivots upon one central premise, namely, that CMRS licensees should have the flexibility to maximize the use of their assigned frequencies in order to serve customer demand more efficiently. As the Commission emphasized, "[w]e believe that our regulatory approach should allow licensees to adapt quickly to technological innovation and changing consumer demands." *Notice* ¶ 24. More specifically, with respect to PCS, the Commission observed that it "always . . . intended wireless local loop to be a part of the family of services that meet our definition of PCS, whether implemented as a

mobile or fixed service." *Notice* ¶ 13. Further, it tentatively concluded that "[b]roadening the permissible service options for cellular and SMR results in those CMRS providers having more flexibility to meet market demand, including meeting demand that has traditionally been serviced by wireline common carriers." *Notice* ¶ 16.

DSC agrees with the Commission. DSC submits that there is no reason why CMRS providers should not have the flexibility to meet consumer demand. This is especially true with respect to broadband PCS. Not only, as the FCC explains, did the Commission's discussions in the proceedings implementing PCS consistently contemplate fixed PCS uses, but the broadband PCS rules are written with only a modicum of technical requirements, designed primarily to protect co-channel licensees in adjacent geographic areas<sup>5</sup> and licensees on adjacent frequency blocks.<sup>6</sup> As a result, PCS licensees already have considerable flexibility in how they use their spectrum.

In response to the Commission's query in the *Notice*<sup>7</sup>, the market, not regulation, should determine the proper uses of the spectrum. Certainly this is in keeping with the tenor of the new legislation. Market forces will efficiently dictate the optimal use to which the spectrum is put. Certainly in those areas where demand for mobile services is not as great, *e.g.*, rural areas, wireless local loop<sup>8</sup> offers significant advantages over wireline technologies in terms of cost and speed of deployment. Moreover, because PCS spectrum, for example,

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<sup>5</sup> See 47 C.F.R. §§ 24.232 (power limits) and 24.236 (field strength limit at edge of coverage area).

<sup>6</sup> 47 C.F.R. §§ 24.229 (frequencies), 24.235 (frequency stability within block), and § 24.238 (energy attenuation at block edge).

<sup>7</sup> *Notice*, ¶ 14.

<sup>8</sup> DSC agrees with the FCC's definition of wireless local loop: the path between the subscriber and the first point of switching or aggregation of traffic. *Notice*, ¶ 6.

will probably not be fully utilized for mobile applications in sparsely populated areas, the flexibility proposed in the *Notice* will improve the spectral efficiency of PCS licensees' operations in those areas.

In more densely populated areas, where the demand for mobile services is correspondingly higher, licensees should still have the flexibility to utilize their assigned spectrum in the matter they believe is most responsive to the market. If there is a strong demand for mobile, then the market will steer the spectrum toward that use. If there is a demand for a competitor to the incumbent local exchange carrier, then the market may push the use toward WLL. In either case, consumer choice will be the determining factor in choosing the proper use of the spectrum. There is no better measure of the "public interest."

While DSC supports the Commission's proposal to let CMRS deploy fixed WLL service in their licensed spectrum, DSC also urges the Commission to consider other spectrum in which the benefits of Airspan® and other WLL technologies can be made available to the public. Demand for mobile uses of CMRS spectrum may be high enough in many areas to result in CMRS licensees in those areas making only limited use of any flexibility to offer fixed services. However, as shown above, wireless local loop offers numerous significant benefits, some facilitating the rapid introduction of facilities-based competitors to the local exchange carriers, a central objective of the new legislation. Accordingly, DSC urges the Commission not only to adopt the added flexibility discussed in the *Notice*, but also to consider other spectrum homes for wireless-based loop services in the 1.3-2.7 GHz.

Spectrum in this range is particularly appropriate for WLL. DSC (and other manufacturers) are building WLL products for use in the 1.3-2.7 GHz bands. In many countries, microwave radio links operating in these frequencies have been or are being taken

out of service and replaced with optical fiber systems or digital point-to-point radio links in spectrum above 3 GHz. As a result, spectrum is freeing up below 3 GHz for new radio-based services, including fixed WLL. Were the FCC to adopt spectrum in this range for fixed WLL applications, then the American public could receive the full benefit of these technology advances and the competition such equipment would bring to traditional wireline applications. Airspan® has been designed to be frequency agile in the 1.3-2.7 GHz band to take advantage of these developments, hopefully here in the United States, as throughout the rest of the globe.

#### **IV. NO SPECIAL TECHNICAL OR OPERATIONAL RULES ARE NECESSARY TO DEPLOY WLL TECHNOLOGY IN THE BROADBAND PCS SPECTRUM**

In response to the *Notice's* questions about the need for technical and operational rule changes (*Notice*, ¶¶ 15, 17), DSC believes, as a general matter, that no special additional rules are required in the broadband PCS spectrum. DSC's fixed wireless products can operate within the existing broadband PCS rules governing power and antenna height limits, albeit the potential range of the equipment, and thus maximum cell size, may be reduced.<sup>9</sup> Similarly, WLL can be deployed so as to meet the field strength limits in Section 24.236.<sup>10</sup> Further, the PCS frequency stability and emission mask rules are "block-specific," allowing WLL to operate within those parameters, using filtering as appropriate.<sup>11</sup> Concomitantly, there are no channelization rules in the broadband PCS spectrum, so many different WLL channelization schemes are possible. In short, since the broadband PCS licensees control the

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<sup>9</sup> 47 C.F.R. § 24.232.

<sup>10</sup> Moreover, Section 24.236 gives licensees in adjacent areas of service the ability to agree to a higher field strength. This flexibility should apply equally to fixed WLL operations.

<sup>11</sup> See 47 C.F.R. §§ 24.235 and 24.238.

utilization of their assigned spectrum, they will be able to coordinate the fixed and mobile uses within the spectrum and within their area of operation. These licensees will determine, through their response to consumer demand, the appropriate mix of mobile and fixed uses of their spectrum, and the most efficient technology for this purpose.

As noted above, DSC has developed its WLL products to operate over a frequency range that includes the broadband PCS bands, *e.g.*, 2 GHz. DSC has not analyzed the rule changes that may be necessary in the cellular and SMR frequency bands., *i.e.* 800 and 900 MHz.<sup>12</sup> However, as a general matter, *within* the assigned spectrum and the geographic areas of operation, licensees should have the flexibility to adopt whatever channelization plans they feel are appropriate. Similarly, as long as out-of-band and co-channel/frequency-block criteria are met, fixed stations should be able to use power levels that are at least as large as those prescribed for CMRS base stations.

## V. CONCLUSION

For the foregoing reasons, the FCC should adopt its proposal to afford CMRS licensees the flexibility to offer fixed wireless local loop services. Consumers, through their marketplace decisions, will then be able to obtain the array of fixed and mobile uses of CMRS spectrum of most value to them. DSC's Airspan® line of products provides a vivid example of the sort of fixed uses which will thus be made available to American consumers, just as they are now, or soon will be, in more than a dozen countries around the world. Finally, while the Commission's proposal represents an important first step for introducing

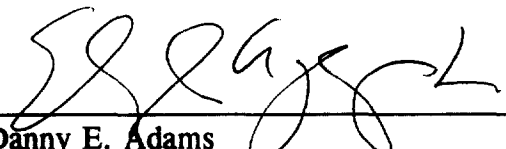
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<sup>12</sup> DSC is studying those applications and reserves the ability to address these issues more fully in its reply comments.

WLL to the United States, the FCC should also consider making other spectrum available for fixed WLL in the 1.3-2.7 GHz band.

Respectfully submitted,

DSC COMMUNICATIONS CORPORATION

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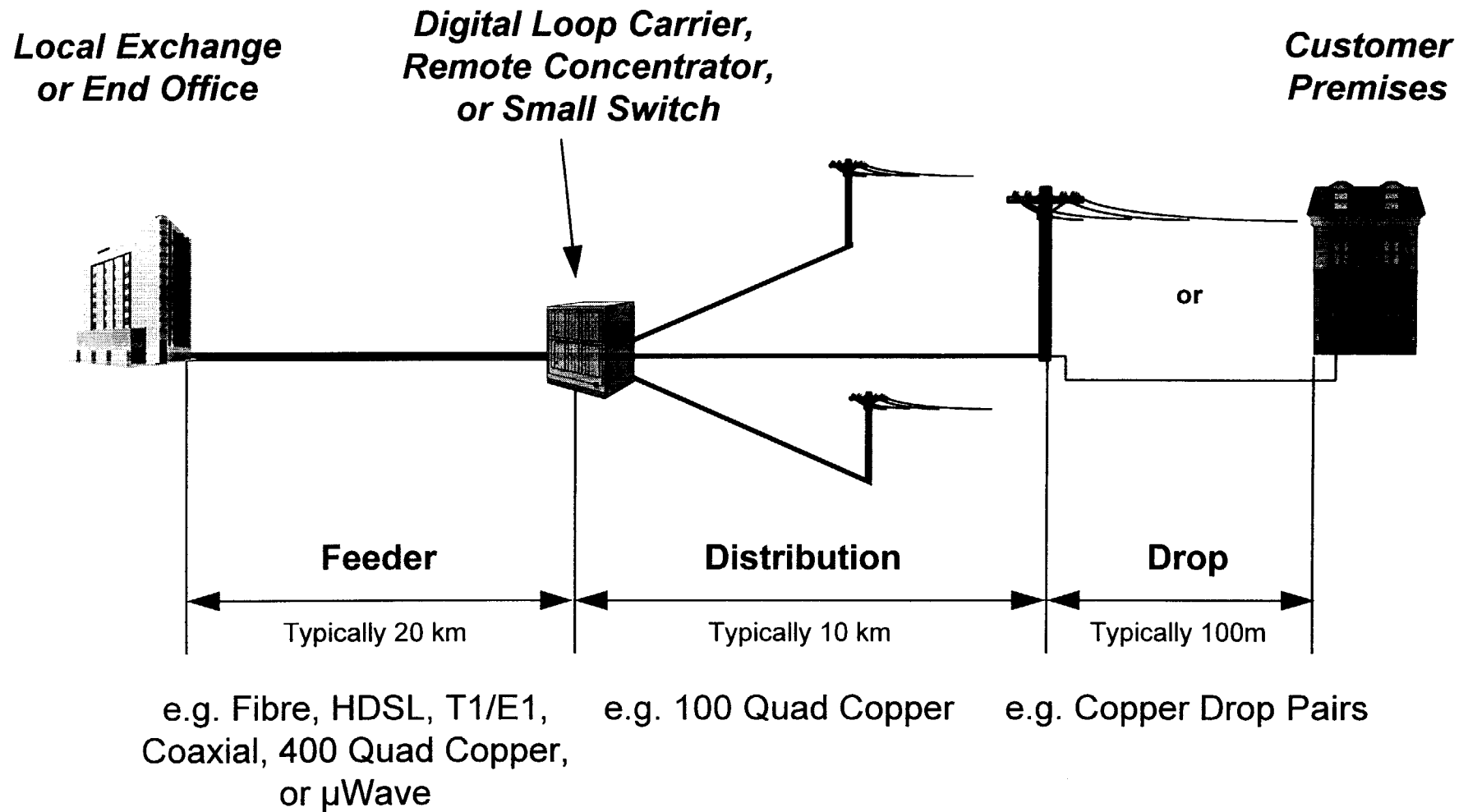
March 1, 1996

Its Attorneys

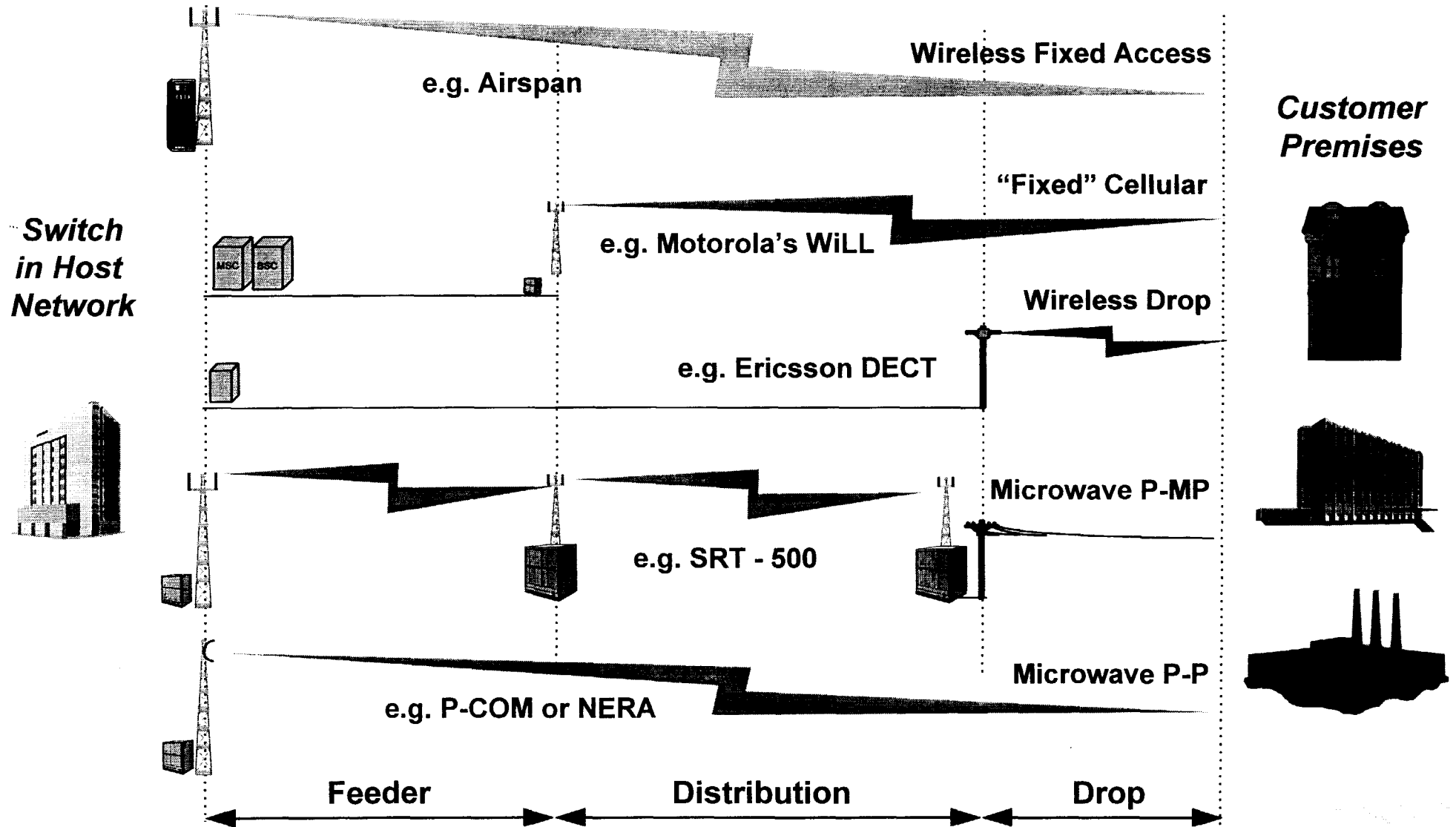
Date: January 1996  
Author(s): Airspan Marketing

# What is Wireless Fixed Access (WFA)?

# Traditional Access Architecture



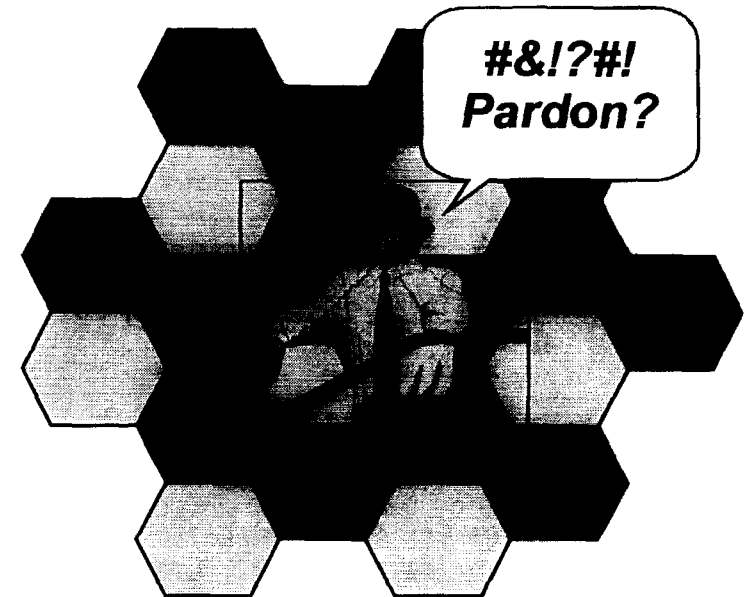
# Wireless Local Loop - Architectures



# Fixed Cellular

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- ***Fixed Cellular WLL*** is adapted from **Mobile Cellular Systems**
  - TACS, AMPS, GSM, IS-95 and DCS1800.
- Can provide Fixed and Mobile Services
- Well Proven Technology
- High Capacity
- Relatively Cheap
- Limited Services, Poor Quality and Reliability



***Cannot support Fixed Network  
Services and Quality***

# Wireless Drop

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- *Wireless Drop is based on Cordless technologies*
  - CT2, PACS, PHS, and DECT
  - High Quality Telephony
  - Neighborhood Mobility
  - Well Proven (CT2)
- However systems are;
  - Limited by Short Range (100m)
  - Telephony Only (except DECT)
  - Cheap but Infrastructure is Expensive



***The Economics of Deploying  
Thousands of Small Cells don't Work***

# Point-to-Multipoint Microwave

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- ***Traditional P-MP Microwave***
  - Remote Rural Telephony
  - The “Heineken” Solution
- **Systems are designed for;**
  - Harsh Environments
  - Difficult Radio Conditions
  - Long / Extended Range
- **P-MP Systems are;**
  - *Expensive*
  - *Spectrally inefficient (poor re-use)*
  - *Low Capacity*

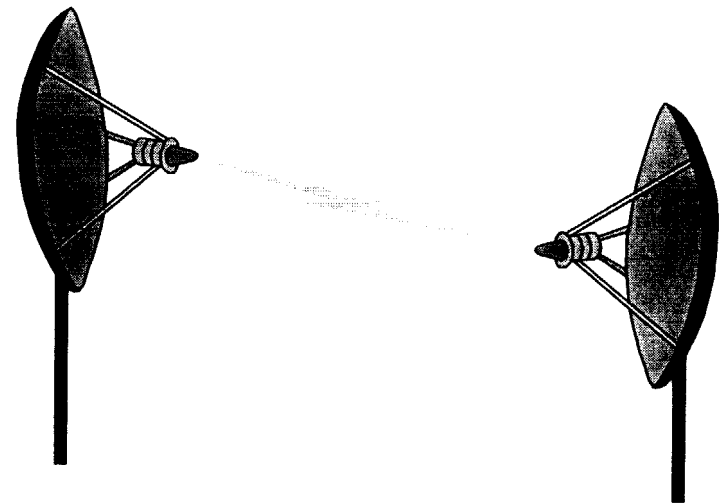


***Not Optimized for Urban / Suburban***

# Point to Point Systems

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- ***Point to Point Microwave Systems*** support two **Wireless Local Loop Applications**:
  - Radio Feeder for Digital Loop Carriers - like LS-120
  - High Capacity Services (N x E1) for Business applications
- Systems can only be deployed in small numbers - Poor Frequency Re-use.
- Expensive for Capacities of less than 1 x E1 (2.048Mbit/s)



***Niche Applications only!***

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# Wireless Fixed Access (WFA)

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- ***Wireless Fixed Access systems*** are “Designed for Purpose”:
  - Fixed Network services by Radio
  - Wide-Area coverage
- Systems support Telephony and Advanced Services
- Rural, Sub-urban and Urban Deployment
- Systems are simple to Plan, Install and Operate



***A true alternative to Copper Local Loops***

# **WLL Architecture Comparison**

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**Only Wireless Fixed Access simultaneously provides:**

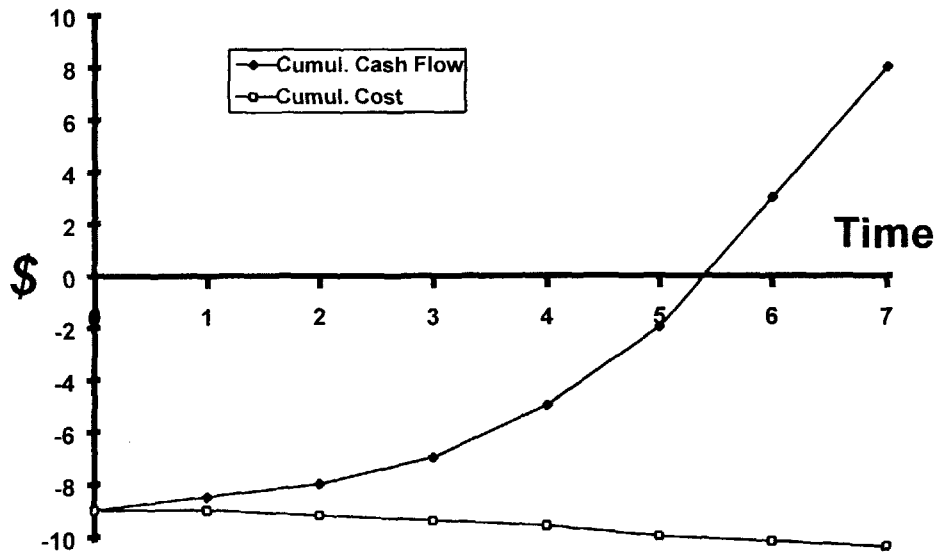
- ◆ **Wide Area Coverage**
- ◆ **Fixed Network Speech Quality**
- ◆ **Voice Band Data and Fax Transparency**
- ◆ **64kbit/s and ISDN (2B + D)**
- ◆ **Spectrum Efficiency**
- ◆ **Flexible Planning**

***Airspan is a “Designed for Purpose” System***

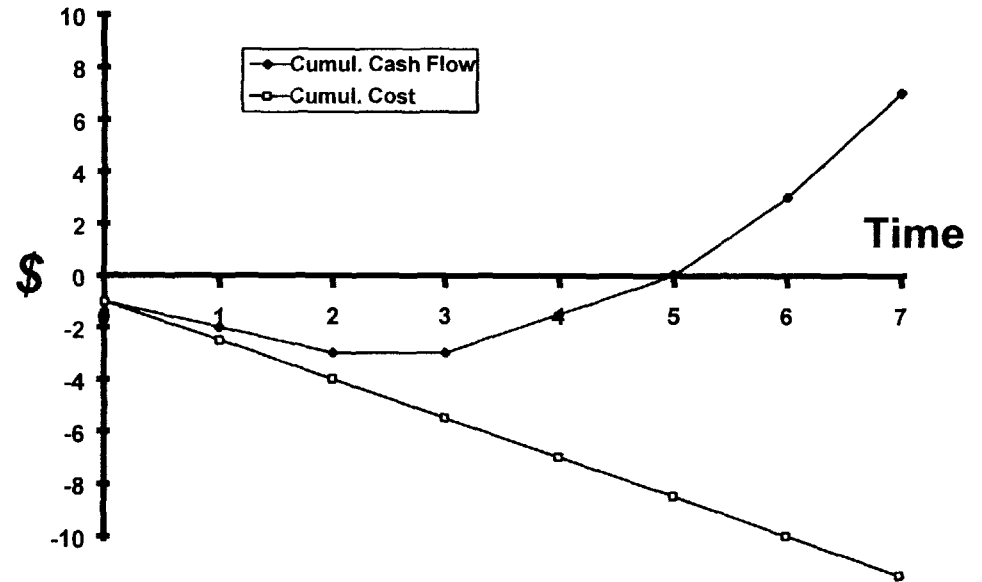
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# **Airspan Wireless Fixed Access - System Benefits**

# Better Economics: Capital Investment



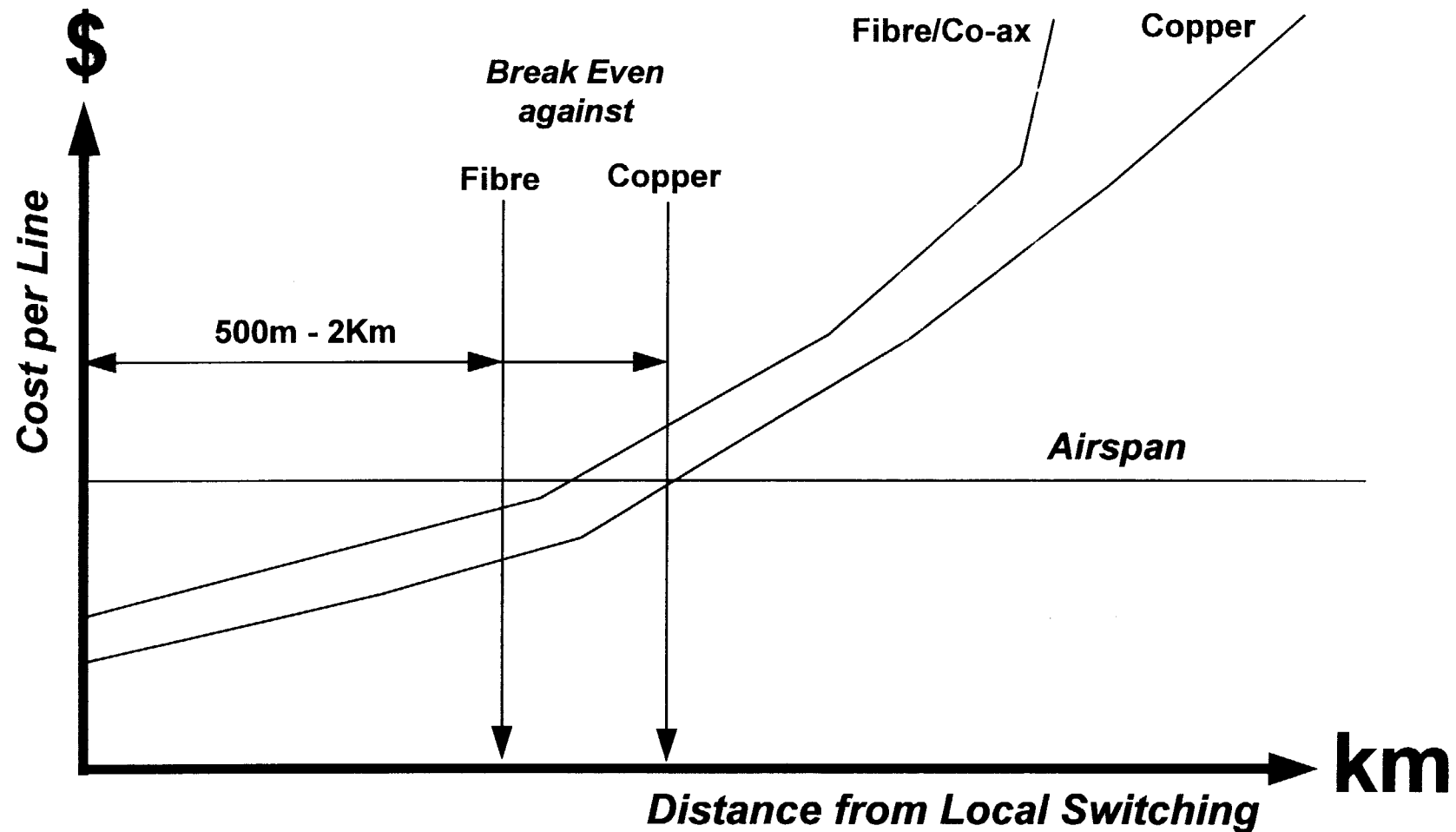
***Copper Capital / Cash Flow***  
***Investment Required = 9 Units***



***Airspan Capital / Cash Flow***  
***Investment Required = 3 Units***

***Airspan Deployment requires a third (1/3)  
less Capital. Investment is Incremental,  
based on lines producing Revenue***

# Better Economics: Reduced Deployment Costs



***Deployment Costs for Longer Loops  
are reduced using Airspan***

# **Faster to Deploy: Build the Network**

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- **Deployment of an Airspan Access network is faster than Copper;**
  - **Planning Phase**
    - **Equivalent to Copper - Accelerated used Computer Tools**
  - **Civil Works**
    - **Limited to Base Station Preparation**
  - **Planning Permissions**
    - **Limited to Antenna Towers - No Right-of-Way Problems**
  - **Installation and Commissioning (of the Network)**
    - **2-5 days per Base Station Site - Not Months of Trenching**
  - **Installation at Customer Premises**
    - **2 Hours per Subscriber**

***Large, Wide-Area Networks  
constructed in Months not Years!***

# Flexibility: The Ability to Re-deploy

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- ***Airspan is a Tool that helps “Rollout a Network”***

- **Initial Phase:**

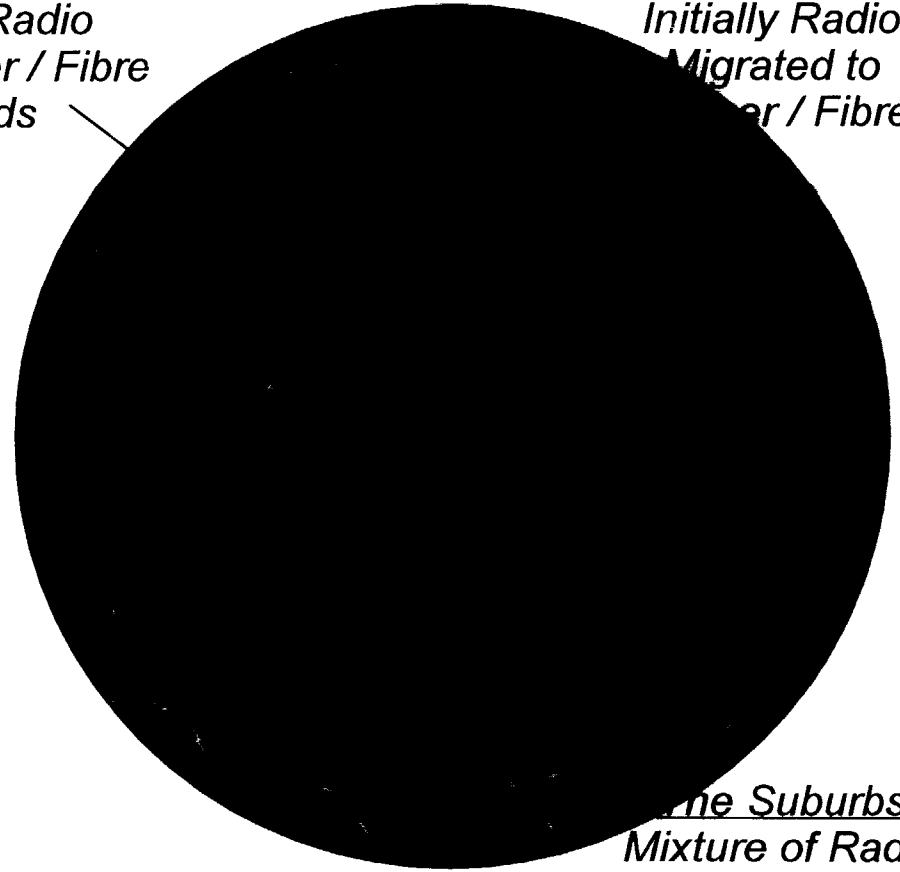
- **Rapid Construction**
- **All Areas**

- **Later Phases:**

- ***Re-deploy Urban Radio into Rural / Suburban Areas***
- ***“Back Filling” with Copper / Fibre Systems***

Rural Areas  
Mainly Radio  
with Copper / Fibre  
Islands

High Density  
Urban Core  
Initially Radio  
Migrated to  
Copper / Fibre



The Suburbs  
Mixture of Radio  
and Copper / Fibre  
based Access

***Networks can be Deployed based on  
Optimal Economics to minimize Cost***